REMARKS

I. Claim Status

Claims 1-47 were originally filed. In response to the telephonic Restriction Requirement and Species Election of 7 December 2007, Applicants elected with traverse the invention of Group I, corresponding to claims 1-36 and 39-45. In an Office Action dated 14 January 2008, the Examiner indicated claims 17, 18, 34, 35, 37, 38, and 44-47 were withdrawn based on the restriction and species election. In an Amendment filed 14 July 2008, re-filed on 5 September 2008, Applicants amended claims 1-3, 9-11, 16, 19, 21, 22, and 28, canceled claims 6-8 and 39-45 without prejudice to their renewal, and added new claims 48 and 49. Thus, claims 1-5, 9-38, 46-49 were pending. In a Request for Continued Examination dated 6 July 2009, Applicants amended claims 1, 10, and 11, and canceled claims 2-5 without prejudice. Thus, claims 1, 9-38, and 46-49 were pending. In an Amendment dated 22 March 2010, Applicants amended claims 1, 12, 13, 16, 27-31, and 36, and canceled claims 9-11, 17-26, 34-35, 37-38, and 46-47 without prejudice. Thus, claims 1, 12-16, 27-33, 36, 48, and 49 were pending.

Claims 1, 13, 14, 15, 16, 48, and 49 are amended herein, and claims 27-33 and 36 are canceled without prejudice. Accordingly, claims 1, 12-16, 48, and 49 are pending. Support for amended claims 1 and 16 can be found throughout the specification, for example, at paragraphs [0016] and [0028]. The remaining amendments merely clarify claim language. No new matter is introduced by any of these amendments, and entry of the amendments is respectfully requested.

II. Rejections under 35 U.S.C. §112, first paragraph

Claims 1, 12-16, 48, and 49 were rejected under 35 U.S.C. §112, 1st paragraph. Specifically, the Examiner stated that "the specification, while enabling for a method for treating a subject having a hemoglobinopathy, the method comprising administering to the subject in need thereof a compound, wherein the compound inhibits hypoxia inducible factor (HIF) prolyl hydroxylase and wherein the compound increases expression of the gene encoding γ-globin in a bone marrow derived cell, or hematopoetic stem cells or blast forming erythroid (BFU-E) cells in the subject ... does not reasonably provide enablement for a method for treating a subject having a hemoglobinopathy in other population[s] of cells." The Examiner further stated that the "scope of claims requires that the compound that inhibits (HIF) prolyl hydroxylase increase expression of the gene encoding γ-globin in any type of cell population which includes any type of organism derived cell ...." (Office Action, page 4.)

Amended claim 1 recites use of a compound that "increases expression of the gene encoding γ-globin in a bone marrow derived cell, a hematopoetic stem cell, or a blast forming erythroid (BFU-E) cell." Accordingly, claims 1, and claims 12-16 and 48-49, which depend directly or indirectly from claim 1, recite subject matter confirmed by the Examiner to be enabled. Therefore, Applicants respectfully request withdrawal of the rejection of claims 1, 12-16, and 48-49 under 35 U.S.C. §112, 1st paragraph.

III. Rejection of Claims Under 35 U.S.C. §102(e)

Claims 1, 12, 13, 15, 16, 27, and 48-49 were rejected under 35 U.S.C. §102(e) as being anticipated by Klaus et al., U.S. Patent Application Publication No. 2003/0153503, published August 14, 2003, filed December 6, 2002 (Klaus et al.). The Examiner stated that "Klaus et al. discloses a method for treating a subject having anemia related conditions or disorders such as hemoglobinopathy...." (Office Action, section 10, page 5-6.) Applicants respectfully traverse.

Claim 1 is amended above to recite methods for "treating a hemoglobinopathy in a subject." The issue therefore is whether methods for treating a hemoglobinopathy in a subject are anticipated by Klaus et al. under 35 U.S.C. §102(e). Section 102(e) recites in relevant part "a person shall be entitled to a patent unless . . . the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent . . . ." To assert a claim is anticipated under 35 U.S.C. §102, a party "must demonstrate . . . identity of invention." *Minnesota Min. and Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321, 1326 (Fed. Cir. 1992). That is, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Also see Manual of Patent Examining Procedure (MPEP) § 2131 (8th Ed., latest revision July 2010).

Klaus et al. discloses methods for increasing endogenous erythropoietin and for treating anemia. (See, e.g., paragraphs [0017] and [0018].) Anemic conditions are defined to include "any condition, disease, or disorder associated with anemia." (See, e.g., paragraph [0080].) However, Klaus et al. does not disclose use of a compound that "increases expression of the gene encoding γ-globin in a bone marrow-derived cell, a hematopoietic stem cell, or a blast-forming unit erythroid cell" as recited in amended claim 1. Therefore, Klaus et al. does not set forth each and every element recited in claim 1, and does not anticipate claim 1 for at least this reason. Accordingly, claim 1, and claims 12, 13, 15, 16, 48 and 49,

which depend directly or indirectly from claim 1, are not anticipated by Klaus et al., and Applicants respectfully request withdrawal of the rejection of these claims under 35 U.S.C. §102(e) as being anticipated by this reference. Claim 27 is canceled above and the rejection is therefore moot as to this claim.

IV. Rejection of Claims Under 35 U.S.C. §103

Claims 1, 12-16, 27, and 48-49 were rejected under 35 U.S.C. §103(a) as being unpatentable over Klaus et al., in view of Perrine et al., International Publication No. WO 93/18761 (Perrine et al.). The Examiner stated that "Klaus et al. discloses a method for treating a subject having anemia related conditions or disorders such as hemoglobinopathy . . . comprising administering to a subject in need thereof a compound which inhibits HIF prolyl hydroxylase . . . ." (Office Action, section 11, page 7.) The Examiner stated that "Klaus et al. does not teach that the hemoglobinopathy is β^{o}- or β^{+}- β thalassemia," but that Perrine et al. "teach other types of β thalassemia . . ." and that "it would have been prima facie obvious to one of ordinary skill in the art to have used the method of Klaus et al. to treat other β thalassemia disorders . . . ." (Office Action, section 11, page 8.) Applicants respectfully traverse.

The question is whether it would have been obvious to one of skill in the art to apply the methods of Klaus et al., which were disclosed to increase endogenous erythropoietin and thereby treat anemia, to a subject having a hemoglobinopathy in the expectation of treating the hemoglobinopathy as presently claimed in view of Perrine et al. Section 103 provides in relevant part that "a patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a). Obviousness is a question of law based on underlying factual inquiries, which were enunciated by the Court as follows: (A) identifying the scope and content of the prior art; (B) ascertaining the differences between the claimed invention and the prior art; and (C) resolving the level of ordinary skill in the pertinent art." *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). The *Graham* factors were reaffirmed and relied upon by the Supreme Court in its consideration and determination of obviousness in the fact situation presented in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007).

The Examiner characterized Klaus et al. as disclosing "a method for treating a subject having anemia related conditions or disorders such as hemoglobinopathy." (Office Action, section 11, page 7.) As noted

above, Klaus et al. does not disclose treatment of a hemoglobinopathy in a subject as recited in the instant claims, using a compound that increases increases expression of the gene encoding γ-globin in a bone marrow-derived cell, a hematopoietic stem cell, or a blast-forming unit erythroid cell. Similarly, Perrine fails to provide any disclosure relating to the use of such compounds. The Examiner stated that Perrine et al., teaches "other types of β thalassemia such as β^0- or β^+- β thalassemia" and thus makes it "prima facie obvious to one of ordinary skill in the art to have used the method of Klaus et al. to treat other β thalassemia disorders...." (Office Action, section 11, page 8.) However, as noted previously, the present claims require the use of a compound that capable of increasing expression of the gene encoding γ-globin in a bone marrow-derived cell, a hematopoietic stem cell, or a blast-forming unit erythroid cell. As neither Klaus nor Perrine, singly or in combination, teach the use of such a compound, the claims as amended are not obvious based on the teachings of Klaus et al. singly or in view of Perrine et al.

Applicants thus respectfully request withdrawal of the rejection of claims 1, 12-16, 48, and 49 under 35 U.S.C. §103(a) as being unpatentable over Klaus et al. in view of Perrine et al. Claim 27 is canceled above and the rejection is therefore moot as to this claim.

V. Rejection of Claims Under 35 U.S.C. §103

Claims 28-31, 33, and 36 were rejected under 35 U.S.C. §103(a) as being obvious over Bohmer et al., International Publication No. WO 01/12784 (Bohmer et al.), cited previously, in view of Skarpidi et al., (2003) Exp. Hematol. 31:197-203 (Skarpidi et al.), as evidenced by Klaus et al. These claims are canceled above, and this rejection is therefore moot.

VI. Rejection of Claims Under 35 U.S.C. §103

Claim 32 was rejected under 35 U.S.C. §103(a) as being obvious over Bohmer et al., International Publication No. WO 01/12784, in view of Skarpidi et al., (2003) Exp. Hematol. 31:197-203, as evidenced by Klaus et al., United States Patent Application Publication No. 2003/0153503 as applied to 28-31, 33, and 36, further in view of Perrine et al., International Publication No. WO 93/18761. Claim 32 is canceled above, and this rejection is therefore moot.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that the claims are fully in condition for allowance and request notification to that effect.

Applicants claim small entity status under 37 C.F.R. 1.27.

The Commissioner is hereby authorized to charge the total of the fees due in this communication to Deposit Account No. 50-0811, referencing Docket No. FP0617 US.

Please call Applicants' representative at 415-978-1740 with any questions regarding the present communication or the above-identified application.

Respectfully submitted,

Date: 9 Dec 10

By: _____

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